BADCT GUIDANCE DOCUMENT

FOR

INDUSTRIAL WASTES AND WASTESTREAMS

DRAFT

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Arizona Department of Environmental Quality

Water Quality Division
Aquifer Protection Program

1.0 INTRODUCTION

This guidance document has been developed by the Arizona Department of Environmental Quality (ADEQ) to explain an important element of the Aquifer Protection Permits (APP) Program. This document is responsive to the Water Quality Advisory Council, which may, pursuant to Arizona Revised Statutes (A.R.S.) 49-204.C, advise and make recommendations regarding technology based standards. The Council has requested the department to provide information regarding the requirements of A.R.S 49-243.B and A.R.S. 49-243.D. These parts of the statute describe the requirements for technology based discharge limitations, the basis for the applicant's demonstration, and criteria for the design construction and operation of facilities subject to the permitting process.

In brief, the statutes require a pollution control technology demonstration for permit issuance which is otherwise known as <u>Best Available Demonstrated Control Technology</u> (BADCT). This document will guide the selection of an appropriate BADCT based upon negotiation between ADEQ and the APP applicant.

1.1 Focus of Document

Due to the nature of industrial wastestreams, facilities may be regulated by either the federal, state or local governments depending on the characteristics of the wastes and the method of disposal. The initial focus of the document is to guide permit writers and the regulated community as to the appropriate regulatory route. For facilities which fall under the jurisdiction of the APP program, this document is to be used by the regulated community and the department's permit writers to determine the applicable control technologies for commercial and industrial facilities to fulfill the Aquifer Protection Permit requirements.

1.2 Purpose of the Document

The purpose of the document is to provide guidance to the Aquifer Protection Permit applicant and to the Departments permit writers in evaluation of the BADCT requirements described in A.R.S. 49-243. The document is intended as guidance and does not waive any applicable federal, state, or local laws, rules, regulations, or ordinance.

1.3 Applicability

The BADCT requirements of the A.R.S.49-243 apply only to those facilities that require an Individual Aquifer Protection Permit. A determination of which facilities require an APP and those which are exempt, is addressed in section 2 of this document.

1.4 How to Use This Document

The document provides a description of federal treatment standards and their applicability to the

Aquifer Protection Permits process. Appendix A is a reference of technical publications which provide background for specific industrial point source standards. The applicant should use the treatment technologies which are applicable to wastestreams or industrial processes which most closely resemble those subject to Permit requirements. Mode of discharge and the qualitative characteristics of the wastestream should be the primary considerations. Site specific conditions which justify lower or higher levels of treatment should also be considered. This document may also be useful in the comparative evaluation of alternative controls which is required in an individual permit application.

2.0 Determination of Regulatory Route

All discharging facilities as specified in A.R.S. 201, and A.R.S. 241.B are required to obtain an Aquifer Protection Permit. A.R.S. 201 states "discharge means the addition of a pollutant from a facility either directly to an aquifer or to the land surface or the vadose zone in such a manner that there is a reasonable probability that the pollutant will reach an aquifer." A.R.S. 241.B defines discharging facilities categorically, to include any facility which may have:

1) Surface impoundments including holding, storage settling, treatment or disposal pits, ponds and lagoons.

2) Solid waste disposal facilities.

3) Injection wells

4) Land treatment facilities.

5) Facilities which add a pollutant to a salt dome formation, salt bed formation, dry well or underground cave or mine.

6) Mine tailings piles and ponds.

7) Mine leaching operations.

8) Septic tank systems:

   a) whose influent conforms to typical sewage and have a capacity of greater than two thousand gallons per day.

   b) whose influent may not conform to typical sewage and may include motor oil, gasoline paints, varnishes, solvents, pesticides, fertilizers, or other materials not generally associated with toilet flushing, food preparation, laundry and personal hygiene.

9) Groundwater recharge projects and underground storage and recovery projects.

10) Point source discharges to navigable waters.

11) Sewage or sludge ponds and wastewater treatment facilities.

Due to hazardous constituents frequently present in industrial waste and wastestreams, federal regulations may overlap with the statute. Generation, treatment, storage and disposal of hazardous waste as defined by federal regulations fall under the jurisdiction of the Hazardous and Solid Waste Amendments (HSWA) of the Resource Conservation and Recovery Act (RCRA). Therefore a brief discussion of federal requirements is necessary to delineate the boundaries of federal and state regulations/rules.

2.1 Characterization of Wastes

Industrial waste can be characterized as either hazardous or non-hazardous. To assist in the characterization of a waste, the following EPA documents can be referenced.

1) EPA/530-SW-010, June, 1985 "This brochure will help you comply with hazardous waste laws."
   - Specifically identifies wastes according to types of industrial processes.

2) EPA/530-SW-86-019, September, 1986 "Understanding the Small Quantity Generator Hazardous Waste Rules"
   - General identification of hazardous wastes which are often used in small business operations.

Proper identification of wastes and wastestreams is essential to determine APP applicability.

2.2 NON-HAZARDOUS WASTESTREAMS

Industrial wastestreams which are not defined by federal regulations (See 40 CFR 261 Subpart D) as hazardous wastes are considered to be non-hazardous. Non-hazardous wastestreams which discharge according to A.R.S. 201 or 241 need an APP. Any discharge to a wash, river or any surface body of water is considered to be a discharge into the waters of the United States, and requires an National Pollution Discharge Elimination System (NPDES) permit as well as an APP. NPDES permits are also obtained from the Water Quality Division at ADEQ. BADCT requirements are not applicable to groundwater recharge projects or underground storage and recovery projects.

2.3 HAZARDOUS WASTES

2.3.1 Facilities Requiring RCRA Permits

The HSWA enacted on November 8, 1984 prohibit the land disposal, of restricted hazardous wastes without treatment by the Best Demonstrated Available Technology (BDAT) to reduce the contaminant level to the maximum extent possible. Land disposal restrictions or "land ban" restrictions apply to all chemicals as listed in 40 CFR 268 Subpart B which are treated, stored or disposed of in one or more of the following:

- LANDFILLS
- SURFACE IMPOUNDMENTS
- WASTE PILES
- INJECTION WELLS
- SALT DOMES
- SALT BEDS
- UNDERGROUND CAVES OR MINES
- CONCRETE VAULTS OR BUNKERS

Further review of the federal programs and comparison of the list of facilities which are considered to be discharging per A.R.S. 49-241.B, reveals that the Aquifer Protection Permits categorical discharges most closely resemble the facilities subject to land disposal restrictions (See 40 CFR Part 268 and portions of 260 through 266 & 148). It is apparent that the authors of Title 49 Chapter 2 contemplated that the Aquifer Protection Permits program could be adapted to obtain state authorization for implementation of land disposal restrictions. However at this time, RCRA assumes primacy over the state APP program.

If a facility treats, stores or disposes of hazardous wastes using any of the above categories, they are required to be permitted under RCRA by the USEPA as a Treatment, Storage and Disposal (TSD) facility.

If a facility is permitted under RCRA or has interim status to operate as a Treatment, Storage and Disposal facility, it does not need an APP.

2.4 Facilities Not Requiring a RCRA Permit

2.4.1 EXCLUSIONS

There are a number of exclusions from RCRA as specified in 40 CFR 261.4. **If a facility is excluded from RCRA, but has a categorical discharge as specified in A.R.S. 241.B, an APP is required.** Examples of this include:

a) An industrial wastewater pretreatment facility which discharges into a publicly owned treatment works (POTW). The discharge into sewer is regulated under the

Clean Water Act (CWA) Amendments (See 40 CFR 403), and is under the jurisdiction of the city or county which operates the POTW.

b) An industrial wastewater pretreatment facility which discharges into a wash, river, or any surface water body. This requires a NPDES permit as well as an APP.

c) A fly ash pond at a coal burning power generator.

All hazardous waste or byproduct materials from treatment facilities such as sludge are subject to RCRA regulations regarding storage and disposal.

Farmers who dispose of pesticides are excluded from RCRA and an APP if:

a) all empty pesticide containers are triple rinsed.

b) pesticide residues are disposed of on the farm following the instructions on the pesticide label.

2.4.2 GENERATORS

For facilities that generate hazardous waste but do not store on site, a RCRA permit is not required. However, generators are subject to certain regulations as specified in 40 CFR according to the amount generated. These are as follows:

a) Conditionally Exempt Generators- Facilities which generate less than 100 Kg (220 lbs) of hazardous wastes per month or less than 1 Kg (2.2 lbs) of acutely hazardous wastes per month, are exempt from RCRA requirements (See 40 CFR 261.5.G.3), but are required to:

   i) Identify all hazardous waste generated.

   ii) Never accumulate more than 1000 kg (2200 lbs) of waste on site.

   iii) Send this waste to a facility which has been approved by the state to accept such waste.

b) Small Quantity Generators- Facilities which generate 100-1000 kg of hazardous waste per month or less than 1 Kg of acutely hazardous wastes per month, cannot accumulate more than 6000 Kg of waste on site and must properly dispose of the waste to a RCRA permitted TSD facility within 180 days (or 270 days if the closest disposal facility is more than 200 miles away). An EPA Identification Number is required as well as the maintenance of Uniform Hazardous Waste Manifest records. Both of the aforementioned can be processed through the

Hazardous Waste Unit of ADEQ. Contaminant of waste on site is subject to applicable regulations as stipulated in 40 CFR 262 and 265. More information can be obtained from EPA 530-SW-86-019.

c) Large Quantity Generators- Facilities which generate more than 1000 Kg of hazardous waste per month or more than 1 Kg of acutely hazardous wastes per month, are subject to the full requirements of RCRA for waste generators. More information can be obtained from EPA 530-SW-86-001.

The Department regards the RCRA regulations for hazardous waste generators to be insufficient with regards to storm protection, leak protection and drywells. Therefore **any storage of hazardous waste which is not fully contained as to preclude any reasonable probability of discharge and/or is in the drainage area of a drywell requires an APP.**

As a final note, there is an important consideration for all facilities which use man-made chemicals. There are chemicals which are not classified as hazardous under the "Land Ban" regulations of RCRA. However, due to the provisions of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA, a.k.a. "Superfund"), if those chemicals are determined to be hazardous at a later date, and they have contaminated the environment due to improper disposal, the facility of origin (generator) is liable for cleanup of that site of contamination.

3.0 Background of BADCT

A.R.S. Title 49-243.B.1 describes one of the demonstrations an applicant must make in order to be issued an Aquifer Protection Permit (APP). The department has adopted the acronym BADCT, pronounced "bad cat" to refer to the technology requirements associated with this demonstration. A.R.S. 49-243.B.1 states that "the facility will be so designed, constructed and operated as to ensure the greatest degree of discharge reduction achievable through the application of the <u>best available demonstrated control</u> <u>technology</u>, processes, operating methods or other alternatives, including, where practicable, a technology permitting no discharge of pollutants." Determining BADCT for individual APP's is a result of negotiation between the APP applicant and the department, and is based on the further stipulations in the statute.

"In determining best available demonstrated control technology, processes, operating methods or other alternatives, the director shall take into account site specific hydrologic and geologic characteristics and other environmental factors, the opportunity for water conservation or augmentation and the economic impacts of the use of alternative technologies, processes or operating methods on an industry wide basis. However, a discharge reduction to an aquifer solely by means of site specific characteristics does not in itself constitute compliance with this paragraph. In addition, the director shall consider the following factors for existing facilities:

a) Toxicity, concentrations and quantities of discharge likely to reach an aquifer from various types of control technologies.

b) The total costs of the application of the technology in relation to the discharge reduction to be achieved from such application.

c) The age of the equipment and the facilities involved.

d) The industrial and control process employed.

e) The engineering aspects of the application of various types of control techniques.

f) Process changes.

g) Non-water quality environmental impacts.

h) The extent to which water available for beneficial uses will be conserved by a particular type of control technology."

The department believes that items a) through h) listed above may also be considered for new facilities, where appropriate, in the required demonstration.

3.1 Meaning of statutory language

In response to inquiry regarding the meaning of certain terms in the statute, the department offers the following guidance:

3.1.1 With regard to the meaning of "best" in cases where the department has data on treatment of the same or similar wastes using more than one technology. We will consider whether or not one of the technologies performs significantly better. In any case the department will consider only well designed and operated treatment as appropriate for best control technologies.

3.1.2 "Available" means that the technology can be installed or constructed based on known engineering aspects or is a commercially available treatment technology. If the technology is proprietary or patented it must be available for purchase or license from the proprietor.

3.1.3 To be considered "demonstrated" control technology, a full scale facility first should be known to be in operation for the waste or for a waste of similar characteristics. Pilot scale or bench-scale operations will not normally be considered as "demonstrated" control technologies. Pilot scale or bench scale operations may, however, be used in "demonstrating" an engineering design criteria for a control technology, process, operating method or other alternative, which is based upon known, demonstrated engineering principles. Any acceptance of a control technology which has no previous full scale operation, is subject to a guaranteed standard of performance, which will be determined by negotiation between the Department and the APP applicant and incorporated into permit conditions as discharge limitations.

3.1.4 "Practicable" means capable of being done. While costs of implementing control technologies should be considered, a technology should not be ruled out solely because it costs "too much". This is subject to negotiation between the Department and the permit applicant.

3.1.5 "Non-water quality environmental impacts and other environmental factors" include public health, air quality (toxic air emissions), noise, odor, radiation, land use, habitat, visual aspects, energy requirements and the opportunity for recovery, recycling or reuse.

3.1.6 "Opportunities for water conservation & augmentation" indicates that in considering opportunities for water conservation and augmentation the applicant should analyze consumptive water use for each alternative, waste water recycle/reuse systems, substitution of poor quality water supplies, the Ground Water Management Code water conservation requirements, water loss reduction potential, groundwater recharge or underground storage, and elimination of non-functional water uses.

3.1.7 Based on the reference to water conservation and augmentation, the department believes that dilution of a waste stream or commingling of waste streams in order to achieve dilution does not fulfill the requirements of the above description. Federal treatment regulations specifically prohibit dilution as a means of complying with concentration standards.

3.2 Strategy for document development

Early consultation with industry representatives indicated that the department should rely to the greatest practical extent on the guidance documents and development documents which the federal regulatory programs have published for industrial categories. The department has been acquiring and reviewing federal regulations, standards and guidance documents pursuant to the industries recommendations.

3.2.1 BADCT Resources

Examination of the available EPA documents has revealed that the amount of information is extensive. A single industrial category may have many subcategories, and a manufacturing process may have a variety of variant processes within an industrial category. Additionally, federal standards for treatment of a particular pollutant may vary depending on the mode of discharge. Technologic standards may vary depending on which statutory authority the respective standards have been developed. A survey of industries known to be operating in Arizona also indicates that many of the industries for which the EPA has established standards are not located in the state at this time.

Given the volume and the diversity of the EPA's published resources, it is not feasible for the department to attempt to reproduce the EPA documents or substitute state produced guidance documents. Instead the department will attempt to provide a reference manual to guide the reader to the appropriate EPA resources and to explain its relevance or limitations in regard to implementation of the Aquifer Protection Permits Program. The department will maintain a library of relevant EPA documents for use by the public and department staff. It is the department's aim to use the EPA's resources where they can be appropriately applied and when they meet the requirements of Arizona's regulatory framework.

4.0 Comparison of Federal and State Standards

Due to the federal history of regulating environmental quality, it may be appropriate to refer to federal regulations and requirements when developing the technology based standards required for an APP permit issuance. Two federal legislative mandates are directly related to the APP program: the Clean Water Act (CWA) and its amendments, and the HSWA of 1984 to RCRA. Both programs have utilized technology based standards to fulfill the requirements for discharge reduction as stipulated by Congress.

The subsequent sections review the two programs to assist in the determination of applicability to the APP program.

4.1 Clean Water Act Standards

The Federal Water Pollution Control Act of 1972, the Clean Water Act of 1977 and amendments established a comprehensive program under which the EPA was required to issue effluent guidelines, pretreatment standards, and new source performance standards for industrial dischargers. Additionally the EPA was required to promulgate effluent limitations, guidelines and standards applicable to discharges of toxic pollutants.

4.1.1 Applicability of CWA Standards

Standards promulgated pursuant to the Clean Water Act (CWA) as amended are directed at protection of the nation's surface water quality. While Aquifer Protection Permits are required for discharges to navigable waters (See A.R.S. 49-241.B.10), discharges to community sewer systems are exempted by A.R.S. 49-250.B.7. The CWA standards and guidelines may therefore have limited usefulness in regulating most of the discharges subject to Aquifer Protection Permits, but may be very valuable for regulating discharges to lakes and perennial streams. The control technologies and other alternatives which the EPA has analyzed on an industry-wide basis may also be useful examples of applied science which can be adapted for the purposes of BADCT.

4.1.1.1 Conventional Pollutant Standards

Early EPA activity focused on setting standards for so-called conventional pollutants such as Biologic Oxygen Demand (BOD). Total Suspended Solids (TSS), and Ph. These surrogate parameters may or may not represent pollutants which present a hazard to groundwater quality. The EPA has also developed, in some cases, standards for unconventional pollutants such as metals and toxic pollutants. The development of standards for toxic pollutants is an on going process. The department will need to revise or append this document as relevant EPA standards or guidance are promulgated.

4.1.1.2 Production Based Standards

Additionally, many of the standards promulgated by the EPA, rather than being concentration based, are production based. Typically the standards are expressed in terms of allowable pollutant mass discharge rate per unit of production (e.g., mg/m2 or lb/1000 lbs). The most difficult step in verifying compliance is often confirming the production rate. One problem apparent in the application of production based standards is that a large scale production facility could conceivably design and operate in compliance with the production based standard and cause a violation of an Aquifer Water Quality Standard. The subsequent section will discuss the use and conversion of production based standards in detail.

Helpful guidance for the use of CWA standards can be found in the EPA's Guidance-Manual for the Use of Production Based Standards and the Combined Waste Stream Formula, September, 1985. The manual describes the methods of applying equivalent limits within permits or other authorizations. Mass limits or concentration limits may be substituted for production based limits. Daily average production rates are used to determine equivalent mass limits; then, only flow and concentration need to be monitored. Concentration limits are most desirable from the viewpoint of compliance monitoring and the cost of compliance monitoring. Equivalent concentration limits eliminate the need to monitor flow, however if prescribed dilution is a problem, use of mass per day limits combined with routine measurement of actual flow rates may be preferable. Permits should prescribe the equivalent limit, the production and flow rates upon which the limit is based, and the requirement to notify the department of changes in flow rates or production rates which would require the limit to be changed.

4.1.2 Guides to CWA Standards

An index of the CWA standards are published in the Code of Federal regulations; these and their respective background documents can be found in Appendix B.

4.1.3 Description of Clean Water Act Standards

Pursuant to the CWA the EPA was required to establish several different kinds of effluent limitations, guidelines, and standards. They are summarized briefly below:

4.1.3.1 Best Practical Control Technology Currently Available (BPT)

BPT effluent limitations guidelines are generally based on the best existing performance by plants of various sizes, ages, and unit processes within the category or subcategory for control of familiar (i.e. conventional) pollutants. In establishing BPT the EPA considers the total cost in relation to the effluent reduction benefits, the age of equipment and facilities involved, the processes employed, the engineering aspects of the control technologies, process changes, the cost of achieving such effluent reduction, and non-water quality environmental impacts (including energy requirements). The EPA considers industry wide cost of applying the technology in relation to the effluent reduction benefits.

4.1.3.2 Best Available Technology Economically Achievable (BAT)

BAT effluent limitations, in general, represent the best existing performance in the category or subcategory. The CWA establishes BAT as the principle national means of controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. In establishing BAT the EPA considers the age of equipment and facilities involved, the processes employed, the engineering aspects of the control technologies, process changes, the cost of achieving such effluent reduction, and non-water quality environmental impacts.

4.1.3.3 Best Conventional Pollutant Control Technology (BCT)

BCT is not an additional standard but replaces BAT for the control of conventional pollutants. BAT remains in effect for the toxic and nonconventional pollutants. The EPA must apply two "cost reasonableness" tests when establishing BCT. In no case may BCT be less stringent than BPT.

4.1.3.4 New Source Performance Standards (NSPS)

NSPS are based on the performance of the best available demonstrated technology. New facilities have the opportunity to install the best and most efficient production processes and waste treatment technologies. As a result NSPS should represent the most stringent numerical values attainable through the application of the best available demonstrated control technology for all pollutants (toxic, conventional, and nonconventional). NSPS involves the application of process control measures with end-of-pretreatment. Process controls include for example the substitution of heat exchanges for direct contact cooling, recycling of process water, flow reduction, counter-current rinsing, and process chemical substitutes. End-of-pipe treatment may consist of preoxidation, biologic treatment and subsequent pollutant removal by advanced treatment technologies such as filtration, ultraviolet ozonation or peroxide, and activated carbon adsorption. The application of equivalent systems whether biological or chemical-physical including those resulting in zero discharge is not precluded.

4.1.3.5 Pretreatment Standards for Existing Sources (PSES)

PSES are designed to prevent the discharge of pollutants that pass through, interfere with or are other-wise incompatible with the operation of publicly owned treatment works. Additional information regarding pretreatment regulations can be found in 40 CFR Part 403.

4.1.3.6 Pretreatment Standards for New Sources (PSNS)

PSNS have the same purpose as PSES, but they are generally more stringent than the respective PSES.
(source= federal register 11-5-87, pp 42523 et seq.)

4.1.4 Use of CWA Standards

The above summaries are intended to be of assistance to the reader in finding and understanding the function of the applicable CWA standards. As noted in the foregoing text the CWA standards may have limited relevance to the requirements of Aquifer Protection Permit BADCT. It is apparent that BAT and BCT are most applicable to existing facilities, and NSPS are closer to the requirements for new facilities. In some cases BAT and NSPS are identical. It would appear that in some cases the EPA has failed to apply the best available demonstrated control technology as described in the requirements for NSPS. This implies that a higher level of treatment may be necessary to meet the requirements of BADCT.

The reader should be cautious in applying CWA standards for several other reasons. New facilities, according to A.R.S. 49-243.I must implement the beat available demonstrated control technology without regard to cost with respect to an extensive list of organic carcinogens and acutely toxic organic compounds. CWA standards do not take into account site specific factors but do include consideration of economic impacts.

While the purpose of these standards is the protection of surface water quality, the department believes that the technology based standards are useful in determining BADCT and for extrapolation of technologies for categories which the EPA has not established standards. Such extrapolation can be based on the best professional judgement (BPJ) of the permit writer.

4.2 Hazardous and Solid Waste Amendments to RCRA

In response to amendments to the Resource Conservation and Recovery Act enacted through the Hazardous and Solid Waste Amendments of 1984 (HSWA), the EPA must develop technology based treatment standards called Best Demonstrated Available Technology (BDAT). There is a significant overlap of the substances subject to land ban and those which are defined as hazardous substances by A.R.S 49-201.16. All of the RCRA substances designated as "P" wastes are included in A.R.S. 49-243.I, the substances for which BADCT must be implemented without regard to cost in new facilities. Appendix C provides a list of the substances defined in A.R.S. 49-243.I. The subsequent section will discuss BDAT's and their development schedule in detail.

4.2.1 Applicability of RCRA Standards

The federal land disposal restrictions apply to those facilities as discussed in section 2.3 of this document. In terms of treatment technology RCRA draws a distinction between waste and wastewater. "Wastewaters" are defined as wastes containing less than one percent total suspended solids (TSS) and less than one percent total organic carbon (TOC). Wastes containing more than one percent of either TSS or TOC are defined as "non-wastewaters." Treatment technologies and standards may vary depending on whether a waste stream is "non-wastewaters" or "wastewater." Treatment standards apply to all residuals generated by the treatment of the original prohibited waste. Therefore solids from a treatment of a particular waste must meet the non-wastewater treatment standards. A wastewater generated from treatment of this waste must meet the wastewater treatment standards.

4.2.1.1 BDAT Standards Development

Congress set forth a apportioned 66 month deadline for the EPA to determine BDAT for all the listed substances in 40 CFR 268 Part B. BDAT standards for the land disposal restrictions program are to be published in the Federal Register as follows:

- Solvents and dioxins: Final Standards promulgated on November 7, 1986.

- "California List" wastes; Final Standards promulgated on August 8, 1988.

- "Second Third" Final standards promulgated June 8, 1989, (Published 54 Federal Register, June 23, 1989). This list also promulgated treatment standards which were subject to "soft hammer" provisions in the "First Third" list and provided standards for some "Third Third" wastes. "Soft Hammer" indicates that those constituents without specified treatment standards can continue to be disposed of in landfills until May 8, 1989.

- "Third Third" scheduled wastes: Final standards to be promulgated on or before May 8, 1990. "Hard Hammer" provisions will also take effect on this date. "Hard Hammer" indicates that constituents for which the EPA has not promulgated treatment standards will be prohibited from land disposal.

4.2.1.2 Use of BDAT Standards

Aquifer Protection Permits requirements apply to the discharge of any quantity of such substances unless the treatment storage or disposal is permitted under RCRA or has interim status. The department anticipates that the treatment technologies designated as BDAT can be reasonably applied in the demonstration of BADCT for waste streams which are similar to those which have BDAT standards. The use of BDAT in determining BADCT is particularly applicable for new facilities discharging substances defined by A.R.S. 243.D, since available and demonstrated control technologies must be implemented without regard to cost. (The reader should be cautious to ensure compliance with all federal requirements, since no "grandfather rights" are appurtenant to existing facility discharges under the federal land disposal restrictions.) With due consideration for interferences and other factors, treatment technologies for wastestreams which are similar in nature to those which have BDAT standards should be treatable by the same treatment technologies.

5.0 Treatment Technologies and Alternatives

Approaches to waste treatment can be classified into three general areas: waste reduction; waste destruction; and treatment and disposal. Consistent with the intent of RCRA and the APP program, the Department considers the philosophy of no waste generation to be optimum. For all existing and new facilities the reduction of wastes by in process changes, (i.e. recycling and reuse; improving maintenance procedures; and the substitution of less hazardous materials), to reduce waste before production, is considered to be BADCT. In some cases such controls can be implemented without substantial cost or reagent costs, operation and maintenance costs can be reduced, and hazardous waste disposal costs minimized. The department may require that both waste reduction and wastestream treatment be employed in order to achieve the greatest degree of discharge reduction.

Destruction of wastes or treatment to render hazardous waste into nonhazardous constituents is also BADCT. The Department recognizes that many inorganic constituents cannot be destroyed but where feasible, destruction is the preferred method.

The following sections will briefly summarize some of the various methods of waste reduction, and the different technologies available for waste treatment.

5.1 WASTE REDUCTION

5.1.1 Improvements to Existing Facilities

Improvements can often be made in older facilities to reduce water use and pollutant generation. Major in-plant source controls are discussed below.

5.1.1.1 Process Modifications

Problems with difficult-to-treat-pollutants can be ameliorated by finding less toxic, easier to treat substitutes. Often substitutes can be found with little or no added cost. Equalization tanks can prevent shock loading on the treatment systems. Floor drains can be plumbed to sumps which can act as equalization tanks or which can be pumped to containers for alternative treatment and disposal.

5.1.1.2 Instrumentation

Treatment system process upsets can be avoided by the installation of monitoring sensors and alarm systems. Monitoring factors such as flow, pump speed, valve position, tank levels, Ph, dissolved oxygen, and turbidity can be of use in adjusting process controls manually or by using feedback control systems.

5.1.1.3 Solvent recovery

Solvents can often be recovered in sufficiently pure form for reuse or can be filtered for treated for reuse. Solvents of degraded quality can be recovered and used in other areas of manufacturing. Solvent disposal reduction can reduce costs for consumable and hazardous waste disposal.

5.1.1.4 Water Conservation

Non-contact cooling water may require little treatment prior to recycling. Monitoring return rates and blowdown rates can avoid scaling and corrosion and reduces the need for chemical additives.

5.1.1.5 Process Water Pretreatment

Deionization of process water can substantially lower the volumes of hazardous wastes by lowering the percentage of less toxic ions such as calcium and magnesium in precipitated sludge. This will also increase the metal values of the dried sludge which makes them more attractive to recyclers.

5.2 POLLUTANT REMOVAL AND DESTRUCTION

Treatment of waste and wastewater fall generally into physical/biological/chemical systems. In most cases of treatment of industrial wastestreams, a combination of systems is used to achieve BADCT and are dependent on the constituents of the wastestream. The following sections briefly discuss individual methods and the pollutants they remove.

5.2.1 Biological Treatment

The treatment of organic wastes by biological degradation is a time proven method. Any facility which produces wastes of an organic or nutrient nature can use biological treatment effectively. Essentially all biological treatment systems work by using the metabolic capabilities of micro-organisms to breakdown, or oxidize waste into smaller nonhazardous components such as methane, carbon dioxide and inorganic salts. Biologic treatment is always appropriate wherever feasible because unlike other technologies which simply transfer wastes from one medium to another, biotreatment offers partial or complete destruction of waste.

Recently, "bioengineering" has developed to where hydrocarbons, and polychlorinated hydrocarbons can be successfully degraded. Strains of bacteria which are resistant to the toxic effects of hazardous organic wastes and have the ability to utilize hydrocarbons as an energy source, are isolated and used as "seed" material to start a biosystem which will treat the waste.

Efficiencies are high and operation and maintenance costs low.

The subsequent sections address the different microbial metabolic characteristics that can be exploited.

5.2.1.1 Waste Digestion

There are two basic methods by which organic wastes can be treated biologically: aerobic and anaerobic digestion. Method choice is dependent on the constitution of the waste as some wastes are degraded differently under different conditions. Biological treatment is also sensitive to the presence of toxic materials which can down the system. Many wastewater treatment plants will use both aerobic and anaerobic systems. A waste byproduct of biological treatment is sludge, a semi-solid mixture of nutrients and biomass which can no longer be easily decomposed. Sludge can be further treated by a physical or chemical method, or disposed of as agricultural fertilizer, or landfilled depending upon the residual contents.

Aerobic Digestion

Aerobic indicates the presence of oxygen. Micro-organisms which can live in the presence of oxygen use the oxygen to oxidize (breakdown) organic matter into water, carbon dioxide, and inorganic salts. In most cases aerobic treatment is more effective in terms of speed and efficiency of breakdown than anaerobic (without oxygen) treatment. Operation and maintenance costs will be higher though because of the necessity for constant aeration (addition of oxygen) of the system. Temperature control is essential for maximum efficiency.

Anaerobic Digestion

Anaerobic indicates the lack of oxygen. Most micro-organisms which function under anaerobic conditions cannot survive in the presence of oxygen, so oxygen must be excluded from an anaerobic system. Organic matter is broken down anaerobically into a mixture of organic acids, methane, carbon dioxide, water and inorganic salts. The methane can be used as an energy source which can help to ameliorate the operation costs. Temperature control is essential for maximum efficiency.

5.2.1.2 Nutrient removal

Nitrogen (Nitrification)

Organic nitrogen readily undergoes decomposition to ammonia under aerobic or anaerobic conditions. Ammonia can then be nitrified into nitrates by the action of aerobic micro-organisms. The rate of nitrification is dependant on retention time of the treatment process, temperature, Ph and amount of dissolved oxygen (DO) available. Nitrification will normally occur in an aerobic digestion system.

Nitrate (Denitrification)

Nitrate can be denitrified into gaseous nitrogen by the action of anaerobic or facultative (able to survive under aerobic and anaerobic conditions) micro-organisms. The rate of denitrification is dependent on temperature and an organic carbon source which should be a 3:1 ratio to nitrogen. Filter beds, or anoxic packed beds are used as denitrifying medium.

Phosphorus

Phosphorus in wastewater may be rendered insoluble by a selected number of metal salts, including aluminum, calcium and iron. Although there is some utilization of phosphorus by the metabolic activities of micro-organisms, a large phosphate load is best removed by the addition of a chemical precipitant, followed by gravity separation.

5.2.2 Waste Destruction

Waste destruction can generally be classified as reduction or oxidation of the wastes into harmless forms, or different compounds entirely. However, the presence of other elements in a waste may result in the production of pollutants in the process. Care must be taken to identify what wastes are produced from the process, as further treatment may be necessary. Gaseous wastes formed from thermal oxidation processes are amenable to scrubbing by wet air oxidation.

5.2.2.1 Thermal oxidation

Otherwise known as burning, thermal oxidation is an oxidation process that converts the principle elements (carbon, hydrogen and oxygen) in most organic components to carbon dioxide and water. The destruction of the molecular structure usually eliminates the toxicity of the chemical, therefore thermal oxidation is often applicable for strong wastes or concentrated wastes. Some types of thermal oxidation are not appropriate for wastes containing volatile metals such as mercury.

Open Burning

Open burning without control of air, containment of the reaction and without control of gaseous emissions may be appropriate for disposal of waste explosives.

Open Pit Burning

Combustion in a screened pit which is equipped with air injection nozzles may be appropriate for disposal of industrial trash, rubbish, and tar sludge.

5.2.2.1.1 Incineration

Incineration is a high temperature form of thermal oxidation. There are several types of incineration technologies available.

Liquid Injection

Liquid injection incinerators operate by spraying combustible waste mixed with air into a chamber where flame oxidation takes place. The purpose of spraying is to atomize the waste into small droplets which present a large surface area for combustion to take place. These incinerators are widely used for destruction of liquid organic wastes.

Rotary-Kiln

Rotary-kiln incinerators are designed to process solids and tars that cannot be processed in a liquid incinerator. The rotary-kiln is a cylindrical shell lined with refractory material that is horizontally-mounted at a slight incline. It is rotated from 5 to 25 tons an hour at high temperatures with excess air. The rotation causes a tumbling action that mixes the waste with air. The residence time varies depending on the nature of the waste. The primary function is to convert solid wastes to gases and ash. If the ash is free of dangerous levels of hazardous wastes, it is put into a landfill.

Multiple Hearth

A multiple hearth incinerator can be used for wastes which are difficult to burn or that contain valuable metals that can be recovered. It consists of a refractory-lined circular steel shell, with refractory hearths located one above the other. Solid waste or partially dewatered sludge is fed to the top of the unit, where a rotating plow rake pulls it across the hearth to drop holes. The uncombusted material falls to the next hearth and the process is repeated until combustion is complete.

Fluidized Bed (FBI)

FBIs are applicable to the destruction of halogenated organic wastestreams. This type of incinerator consists of a vessel in which inert granular particles are fluidized by a low velocity air stream which is passed through a distributor plate below the bed. A FBI consists of a windbox, through which combustion air is introduced to the reactor, a reactor zone which contains a bed of sand, and waste injection and removal ports. They have been used to treat municipal sewage sludge, low quality fuels, pulp and paper effluent, food processing wastes, refinery wastes and miscellaneous chemical waste.

Molten Salt

These incinerators can be used for in process neutralization of acidic waste gases. In the process, waste material along with air is added below a molten bed of a salt such as sodium barbonate.

Any gases formed in the process are forced to pass the melt and any acidic gases formed are neutralized by the alkalinity of the bed.

Plasma Arc

This system uses a very high temperature (up to 10,000 C) thermal plasma field to break bonds of hazardous waste chemical molecules down to the atomic state. An electrode assembly ionizes air molecules which create a plasma field. Hazardous waste mixtures interact with the field, forming simple molecules such as carbon dioxide, hydrogen, hydrogen chloride, and other minor matrix compounds such as acetylene and ethane.

Lime or Cement Kiln

A cement kiln is basically a large rotary kiln into which lime or cement material is mixed with waste and fed countercurrent to combustion gas flow. The products formed are alkaline and so act as a scrubber, removing acid gases formed during combustion. Such a system operates at 2,800 degrees resulting in a very efficient removal of wastes.

Supercritical Oxidation

Wastes are mixed with live steam (Steam at temperatures exceeding 650 degrees centigrade under high pressure) which causes the precipitation of inorganics and almost complete oxidation of organics to carbon dioxide and water.

Wet Air Oxidation (WAO)

The aqueous phase oxidation of dissolved or suspended organic substances has been developed and commercialized, primarily as a less expensive alternative to some other types of chemical oxidation processes. It has been used to treat sewage sludge, regenerate activated carbon, and treat process wastewaters containing pesticides. Petrochemical wastes, cyanides, phenolic compounds, and some chemical production wastes. WAO is most applicable to waste streams containing organics in the 500 to 16,000 mg/l range. Unlike ultraviolet assisted technologies WAO is unaffected by turbidity or metal precipitates, however WAO does not always achieve complete oxidation of organics and in some instances additional treatment may be required. Wet air oxidation followed by chemical precipitation and filtration is determined to be BDAT for cyanide and list metals for wastewaters for the metal finishing aqueous liquids and the metal finishing sludge subcategories.

5.2.2.2 Chemical Oxidation

Chemical oxidation may be used to pretreat prior to biologic treatment or to destroy a variety of organic compounds including phenol and some substituted Phenols. Cyanides and sulfides may also be treated by chemical oxidation processes. Principle oxidants are hypochlorite, chlorine gas, chlorine dioxide, hydrogen peroxide, ozone, and potassium permanganate.

Ultra-violet (UV) assisted Peroxidation

UV light with a wavelength of 254 nanometers reacts with hydrogen peroxide in aqueous solution to form hydroxyl radicals. Hydroxyl radicals have an oxidation potential over twice that of chlorine. Through a variable series of reactions this process dehalogenates and oxidizes organics leaving halides, carbon dioxide and water. In contrast to incineration there is a short warm-up time and no toxic air emissions associates with this process. Turbidity or the presence of metals which precipitate in the process can interfere.

Ultra-violet assisted ozonation

Both ozone and UV light have been documented to oxidize halogenated organics and other organics. The combination of ozone and UV light produces an oxidation rate which is typically many times faster than either alone. The process consists of bubbling ozone through the wastestream while simultaneously irradiating with UV light. Turbidity and precipitating metals can interfere with the process. This method is approved for the FO19 wastes.

Electrolytic oxidation

This method is used for the destruction of cyanide. Carbon dioxide and nitrogen are the products when electricity is applied to cyanide solutions in the presence of oxygen.

5.2.3 Concentration and Separation Technologies (Chemical/Physical)

Wastestreams normally consist of solids which are dissolved or suspended in water. The initial step in separating solid wastes from wastewater is screening it to remove the large particles. Frequently, wastewater will contain a large amount of suspended solids which are not dissolved, but are microscopically small enough that they will remain in solution and cannot be screened out. Separation of suspended solids can be accomplished by several techniques as discussed in Section 5.2.2.1. Dissolved substances, specifically ions and heavy metals, can be separated and concentrated by a variety of processes as discussed in Section 5.2.2.2.

5.2.2.1 Removal of Suspended Solids

Dissolved Air Flotation

Separation of suspended solids from water is brought about by the introduction of finely divided gas bubbles which become attached to the suspended particles, causing them to float to the surface where they can be removed by skimming. Introduction of the gas bubbles is usually accomplished by reducing the pressure of the wastewater causing dissolved gases to be released. This method is commonly used to separate greasy or oily matter from water.

Gravity Separation

In its simplest form, wastewater is contained in a vessel for a sufficient period of time to allow some or all of the suspended material to settle out or float to the surface of the wastewater. The floating matter can be skimmed off and the wastewater decanted for discharge or further treatment. System modifications such as the addition of baffles and corrugated plates can enhance the efficiency of the system. This is most commonly used to separate oils, grease and large suspended solids.

Mechanical Skimming

Mechanical skimming is used in conjunction with separator methods to remove oily wastes or scum which has floated to the surface. The process basically consists of a mechanical arm which skims the surface of the wastewater, and separates the scum to a collection basin.

Coalescing Separation

Oily wastewater is passed through an oleophilic (oil attracting) matrix which removes very small oil particles which would not normally separate in a gravity separator. The matrix must then be cleaned periodically. Coalescing separation is often used after gravity separation to maximize removal. This system cannot handle high solids because of mechanical as well as biological fouling.

Coagulation/Flocculation and Sedimentation

Chemicals are added to a wastestream to promote the coagulation and flocculation of suspended particles. The wastewater is then contained in a vessel for a sufficient period of time to allow coagulation/flocculation. The particulate matter which is now consolidated, settles to the bottom and can be removed as sediment. Chemical flocculants can be added to enhance the effiencency of the previous methods. One disadvantages to this method is the production of a chemical sludge.

Filtration

All filtration systems work on the principle of passing a wastestream through a porous barrier upon which suspended solids will be impacted and separated out. There are several types of filter systems which can be employed. Granular Media, and surface filters are porous filters which remove the majority of suspended solids. Nanofiltration, Electromembrane Separation and Reverse Osmosis use semipermeable filters which can remove even dissolved solids, so they will be discussed in Section 5.2.2.2.

Granular-Media filters or deep bed filtration is a polishing step that removes small amounts of suspended solids and produces a highly clarified water. Chemical coagulation and sedimentation usually precede this step. Graded sand and pulverized coal are commonly used in the filter beds.

Surface filters make use of a fine medium such as a cloth or close mesh screen. In a rotary vacuum filter, the medium is in the form of a continuous belt and it rotates over a perforated drum that is partly submerged over the slurry to be filtered. Water is pulled through the filter cake that forms on the belt to the inside of the drum, where it is transferred to a vacuum system.

Centrifugation

Centrifuges are used for sludge dewatering. The centrifugal force is used to increase the sludge solids sedimentation rate. The choice of centrifuge depends on: 1) Properties of the slurry, 2) properties of the solids, 3) properties of the liquids, and 4) process requirements. Advantages are flexibility in handling thickened or dilute sludge and automation of method. Disadvantages are high energy and maintenance costs.

5.2.2.2 Removal of Dissolved Substances

The chemical and physical characteristics of the pollutant are important in the selection of a removal method. In some cases such as electromembrane separation, a system can be used to recover and recycle a pollutant.

Air stripping is effective for highly volatile organic compounds (VOC). Steam stripping is effective for substances which are not as volatile but have a low vapor pressure at the boiling point of water, whereas evaporation is for those chemicals which will not volatilize. Soluble, small organic molecules are adsorbed by activated carbon, large ions are separated by reverse osmosis nanofiltration, electromembrane separation and ion exchange resins.

When the wastes to be removed are known, specific addition of chemicals which target that particular waste can be utilized. An example of this is the addition of hypochlorite to neutralize a cyanide solution.

5.2.2.2.1 Physical Methods

Air Stripping

Air stripping is the process of volatilizing VOCs into the atmosphere by passing a rapid airstream countercurrent through a waste stream. The waste stream and airstream normally pass through a column which increases the wastestream's surface area which is exposed to air. Compounds which do not degrade in the atmosphere (i.e. UV breakdown) must be trapped by some type of filter and treated further.

Steam Stripping

Steam stripping is a process in which water vapor at elevated temperatures is used to remove volatile components of a liquid. Countercurrent flow is generally used to promote liquid-gas contact, thus allowing soluble gaseous organics from the liquid to be continuously exchanged with molecules within the stripping gas. This is useful only for waste with low water solubilities.

Ammonia Stripping

This process is effective for wastestreams with a high ammonia content. The process is similar to air stripping except that the wastestream is Ph adjusted to be alkaline. This causes the ammonium ion to change to a neutral ammonia atom which is then volatile and can be air stripped.

Evaporation

Evaporation is the process that heats the liquid, venting the vapors to the atmosphere and concentrating the pollutants into a slurry. Because of the reference to water conservation and augmentation in A.R.S. 49-243.B.1 evaporation is not a preferred treatment methodology.

Solvent Extraction

Solvent extraction is a process whereby a dissolved or adsorbed substance is transferred from a liquid or solid phase to a solvent that preferentially dissolves that substance. For the process to be effective, the extracting solvent must be immiscible (unable to mix) in the liquid and differ in density, so that the two solutions will separate. Solvent extraction can be performed as a batch process, or by the contact of the solvent with the feed in staged or continuous equipment. The pollutant can then be removed from the solvent and recycled or disposed of.

Activated Carbon Adsorption

Inorganic and organic chemicals can be adsorbed onto activated carbon. Usually hydrophobic (incapable or resistant to dissolving in water) chemicals are more likely to be removed from the wastestream. Activated carbon treatment is applicable to the treatment of dilute aqueous wastes, but they should be treated first to remove suspended solids, oil and grease. Temperature and Ph are also important for the different compounds to be treated. Two principle types exist: powdered and granular form. Powdered activated carbon presents more surface area for adsorption hence operation is quicker and more efficient. However, the powdered form needs more pumping to get the wastewater through so the costs are increased. Carbon has also been added directly to biological treatment of effluent. The advantage of this is that sludge toxicity can be reduced by selectively removing toxic organics from solution. When the adsorption capacity of the carbon is complete, the carbon is either regenerated or disposed of.

Reverse Osmosis

Reverse Osmosis is the process where a solvent (e.g. water) moves from an area of low solute (dissolved solids) concentration to high solute concentration, across a semipermeable membrane which does not allow the solute to pass. A pressure greater than the osmotic pressure is applied so that the flow is reversed. Pure water will then flow through the membrane from the concentrated solution.

Electromembrane Separation

Electromembrane separation is used for the recovery of specific dissolved metals. Wastewater is forced through a membrane of specific pore size, so that the object metal and only smaller ions can pass through the filter. Electrodes in the effluent stream pass a current equivalent to the electric potential of that object metal so that it will electrolyze either on the cathode or anode depending on its charge.

Nanofiltration

A nanofiltration system operates on a molecular scale, and is related to reverse osmosis. Wastewater is forced through a semipermeable membrane whose pore size is large enough to allow water and small inorganic and organic molecules through. Larger inorganic and organic molecules are removed. This method is especially useful for reducing water hardness and dissolved organic solids.

5.2.2.2.2 Chemical Methods

Neutralization

Neutralization of wastewater adjusts the Ph of the water so that it is neither corrosive (acidic) or caustic (alkaline). Caustic soda (sodium hydroxide) or magnesium hydroxide are two strongly alkaline solutions which are normally used to neutralize strongly acidic wastestreams. Bicarbonate of soda can also be used. To neutralize a caustic solution, dilute hydrochloric acid is frequently used. Care must be exercised to properly calculate the amount of neutralization needed, otherwise the solution can conversely become acidic or alkaline.

Alkalization

Alkalization removes dissolved metals by raising the Ph to an alkaline state. The metals then form hydroxide complexes and precipitate. This is most effective in dilute metal solutions.

Alum Precipitation

Alum is a common chemical flocculent/coagulant in use in many wastewater treatment plants to remove solids.

Iron Coprecipitation

In iron coprecipitation, a ferric salt, such as ferric chloride is added to Ph adjusted wastewater to form iron oxyhydroxide, an amphorous precipitate. Trace elements will adsorb and coprecipitate with the iron precipitate. Chemical flocculants can be added to increase the rate of precipitation. This is a low cost method for removing trace elements such as selenium and arsenic from wastewaters.

Sodium Borohydride

Sodium borohydride is used to reduce and remove inorganic metals. One pound of sodium borohydride can reduce 21 lbs of mercury.

Hexavalent Chromium Treatment

Sodium meta bisulfate or ferrous sulfate can be added which will reduce hexavalent chromium to trivalent chromium. A second reaction with sodium hydroxide will precipitate chromium as a hydroxide.

Ion Exchange/Resin Absorption

Ions are removed by the exchange of ions in solution with other ions which are held in an insoluble resin ion exchanger. Typically, a waste solution is percolated through a granular bed of the ion exchanger, where certain ions in solution are replaced by ions contained in the ion exchanger. Specialized resins are available for the selective removal and concentration of ion species. Wastewater which has been clarified and is relatively pure from interferences is necessary before utilizing this method.

Stabilization

Stabilization reduces the mobility of metals in a waste. Stabilizing agents, binders and other chemicals such as Portland cement, lime pozzolan-based material, and cement kiln dust are added to a waste to reduce quantities of metals that can leach when the stabilized waste is in contact with water.

* Resource Material for this section on Treatment Technologies was gathered from EPA and Department documents, Environmental Journals, and a series of articles written by Paul N. Cheremisinoff in Pollution Engineering.

6.0 EPA Resources

EPA is in a continual process of compiling and updating information on technologies for waste reduction, treatment and disposal. The Department will update this document on a regular basis to keep the regulated community informed of new developments. Currently there are several databases being developed which will be accessible to the public.

6.1 Further information regarding treatment technologies for specific wastes in various types of waters and wastewaters can be obtained from an EPA Database. For more information on how to access the Database, contact:

RE: WERL TREATABILITY DATABASE
Risk Reduction Engineering Laboratory
Environmental Protection Agency
26 W. Martin Luther King Drive
Cincinnati, OH 45268
(513) 684-7503 (FTS)
(513) 569-7503 (Commercial)

6.2 Several new stabilization techniques have recently evolved out of the EPA's SITE (Superfund Innovative Technology Evaluation) program. More information can be obtained from a reference manual published by the National Technical Information Service:

The SITE Program Technology Profiles
(list number) PB89-132-690
National Technical Information Service
U.S. Department of Commerce
Springfield, VA 22161
(703) 487-4650

INDUSTRIAL CATEGORIES SUBJECT TO NATIONAL EFFLUENT LIMITATIONS AND STANDARDS

INDUSTRIAL CATEGORY	40 CFR PART NUMBER
Aluminum Forming	467
Asbestos Manufacturing	427
Battery Manufacturing	461
Builder's Paper	431
Carbon Black Manufacturing	458
Cement Manufacturing	411
Coal Mining	434
Coil Coating (Phase I and II)	465
Copper Forming	468
Dairy Products Processing	405
Electroplating	413*
Electrical and Electronic Components (Phases I and II)	469
Explosives Manufacturing	457
Feedlots	412
Ferroalloy Manufacturing	424
Fertilizer Manufacturing	418
Fruits and Vegetables Processing Manufacturing	407
Glass Manufacturing	426
Grain Mills Manufacturing	406
Gun and Wood Chemicals	454
Hospitals	460
Ink Formulating	447
Inorganic Chemicals (Phases I and II)	415
Iron and Steel Manufacturing	420
Leather Tanning and Finishing	425
Meat Processing	432
Metal Finishing	433**
Metal Molding and Casting	464
Mineral Mining	436
Nonferrous Metals Forming	471
Nonferrous Metals Manufacturing (Phases I and 22)	421
Oil and Gas Extraction	435
Organic Chemicals and Plastics and Synthetic Fibers	414***
Paint Formulating	446
Paving and Roofing (Tars and Asphalt)	443
Pesticides	455
Petroleum Refining	419
Pharmaceuticals	439
Phosphate Manufacturing	422
Photographic	459
Plastics Molding and Forming	463****
Porcelain Enameling	466
Pulp and Paper	430
Rubber Processing	428
Seafood Processing Manufacturing	408
Soaps and Detergents Manufacturing	417
Steam Electric	423
Sugar Processing Manufacturing	409
Timber Products Manufacturing	429
Textiles	410****

* Cross reference to Metal Finishing, Part 433
** Cross reference to Electroplating, Part 433
*** "Organic chemicals and Manufacturing" ()40 CFR Part 414) has been combined with the "Plastic synthetics" point source category (40CRF Part 416); pretreatment standards for new sources are still in effect as previously identified under 40 CFR Part 414, Subpart E.
**** Category is regulated only by the general pretreatment standards found in 40 CFR Part 403.

ATTACHMENT A

ITD PROJECTS

Adhesive and Sealants	Woody Forsht	382-7290
Alcohol	Bill Telliard	382-7131
Aluminum Forming	George Jett	382-7151
Analytical Support	Bill Telliard	382-7131
	Ben Honaker	382-2272
Asbestos	Tom Fielding	382-7156
Battery Manufacturing	Mary Belefski	382-7153
Cement & Concrete Products	Ron Kirby	382-7168
Clays, Gypsum, Refractory & Ceramic Products	Bill Telliard	382-7131
Coal Mining	Bill Telliard	382-7131
Coal Remining	Bill Telliard	382-7131
Coal Slurry Pipelines	Bill Telliard	382-7131
Coil Coating (includes Canmaking)	Mary Belefski	382-7153
Contract Support	Hal Coughlin	382-7192
Copper Forming	George Jett	382-7151
Corrosion Study	Don Anderson	382-7189
Dairy Products Processing	Don Anderson	382-7189
Deep Sea Mining	Bill Telliard	382-7131
Dioxin (Pulp & Paper)	Wendy Smith	382-7184
Domestic Sewage Study	Tom O'Farrell	382-7120
Drum Reconditioners	Don Anderson	382-7189
Electrical & Electronic Components (Phase I & II)	Mary Belefski	382-7153
Electroplating	Mary Belefski	382-7153
Ethanol for Fuel	Bill Telliard	382-7131
Explosives	Tom Fielding	382-7156
Feedlots	Don Anderson	382-7189
Ferroalloy Manufacturing	George Jett	382-7151
Fertilizer (Nitrogen & Phosphate)	Tom Fielding	382-7156
Fish Hatcheries	Don Anderson	382-7189
Foundries (Metal Molding and Casting)	Don Anderson	382-7189
Fruits & Vegetables	Don Anderson	382-7189
Gasohol	Bill Telliard	382-7131
Glass Manufacturing	Wendy Smith	382-7184
Grain Mills	Don Anderson	382-7189
Gum & Wood	Dick Williams	382-7186
Hazardous Waste Treaters	Don Anderson	382-7189
Hospitals	Frank Hund	382-7182
Hot Coating	George Jett	382-7151

ATTACHMENT B

Industrial Laundries	Frank Hund	382-7182
Information - Program Implementation Regulatory Status	Debbie Seal	382-7179
Ink Formulation	Dick Williams	382-7186
Inorganic Chemicals	Tom Fielding	382-7156
Iron & Steel	Ernest Hall	382-7126
Leather Tanning & Finishing	Don Anderson	382-7189
Low BTU Gasification	Bill Telliard	382-7131
Machinery Manufacturing & Rebuilding	Ernest Hall	382-7126
Meat Products & Rendering	Don Anderson	382-7189
Metal Finishing	Ernest Hall	382-7126
Mineral Mining	Matt Jarrett	382-7164
Miscellaneous Chemicals	Woody Forsht	382-7190
Miscellaneous Foods & Beverages	Don Anderson	382-7189
Edible Oils		
Beverages		
Bakeries & Confectioneries		
Miscellaneous Specialty		
Nonferrous Metals Forming	George Jett	382-7151
Nonferrous Metals Manufacturing	Ernest Hall	382-7126
Ocean Thermal Energy Conservation	Rom Kirby	382-7168
Oil & Gas		
Offshore	Dennis Ruddy	382-7165
Inshore (Coastal)	Karen Troy	382-7115
Oil Refining	Dennis Ruddy	382-7165
Ore Mining	Matt Jarrett	382-7164
Organic Chemicals, Plastics & Synthetic Fibers	Woody Forsht	382-7190
Paint Formulation	Dick Williams	382-7186
Paragraph 4(c) Pollutants	Dick Williams	382-7186
Paving & Roofing	Dennis Ruddy	382-7165
Permit Support (General)	Joe Vitalis	382-7172
	Debbie Seal	382-7179
Pesticides	Tom Fielding	382-7156
Petroleum Refining	Dennis Ruddy	382-7165
Pharmaceuticals	Frank Hund	382-7182
Photographics	Ernest Hall	382-7126
Placer Mining	Ernest Hall	382-7126
Plastics Molding & Forming	Woody Forsht	382-7190
Plate making	Ernest Hall	382-7126
Porcelain Enameling	Ernest Hall	382-7126
POTW Pilot Study/Pretreatment	Don Anderson	382-7189

Poultry Processing	Don Anderson	382-7189
Printing & Publishing	Dick Williams	382-7186
Publications & Availability List (ITD Documents only)	Debbie Seal	382-7179
	Joe Vitalis	382-7172
Pulp & Paper	Wendy Smith	382-7184
Builders' Paper & Board Mills		
Converted Paper		
Pulp, Paper & Paperboard		
Dioxin		
Regional Coordinator	Joe Vitalis	382-7172
Rubber Manufacturing	Joe Vitalis	382-7172
Rulemaking Activities	Marion Thompson	382-7117
	Debbie Seal	382-7179
Seafood Processing (canned & preserved)	Don Anderson	382-7189
Shipbuilding	Ernest Hall	382-7126
Shore Receptor & Bulk Terminals	Dennis Ruddy	382-7165
Soaps & Detergents	Woody Forsht	382-7190
Solvent Recovery	Don Anderson	382-7189
Steam Electric Power Generation	Joe Vitalis	382-7172
Sugar Processing	Don Anderson	322-7189
Beet		
Cane Sugar Refining		
Raw Cane		
Superfund Project	Don Anderson	382-7189
Synfuels	Dennis Ruddy	382-7165
Technical Workshops	Marion Thompson	382-7117
Textile Manufacturing	Dick Williams	382-7186
Timber Products	Dick Williams	382-7186
Transportation	Don Anderson	382-7189
Waste Oil Refiners	Dennis Ruddy	382-7165
Water Supply	Don Anderson	382-7189
40 CFR 401 Revisions	Frank Hund	382-7146

ATTACHMENT B

EPA REGIONAL LIBRARIES

Peg Nelson, Librian Environmental Protection Agency* Region I John T. Kennedy Federal Building Room 1500 Boston, MA 02203	(617) 565-3300	FTS: 835-3300
Dennis P. Carey, Librarian Environmental Protection Agency Region 12 26 Federal Plaza, Rom 402 New York, MY 10278	(212) 264-2881	FTS: 264-2881
Diane M. McCrary, Librarian Environmental Protection Agency, Region III 841 Chestnut Street Philadelphia, PA 19107	(215) 597-9800	FTS: 597-9800
Gail Austin,, Librarian Environmental Protection Agency, Region IV 345 Courtland Street, NE Atlanta. GA 30365	(404) 347-4216	FTS: 347-4216
Ms. Lou W. Tilley, Librarian Environmental Protection Agency, Region V 230 South Dearborn Street, 16th Floor Chicago, IL 60604	(312) 353-2022	FTS: 353-2022
Nita House, Librarian Environmental Protection Agency, Region VI 1445 Ross Avenue, 12th Floor, Suite 1200 Dallas, TX 74202-2733	(214) 655-6441	FTS: 255-6441
Connie McKenzie, Librarian Environmental Protection Agency, Region VII 726 Minnesota Avenue Kansas City, KS 66101	(913) 236-2828	FTS: 757-2828
Dolores Eddy, Librarian Environmental Protection Agency, Region VIII 999 18th Street, Suite 500 Denver, CO 80202-2405	(303) 293-1444	FTS: 564-1444
Garry Lau, Librarian Environmental Protection Agency, Region IX 215 Fremont Street San Francisco, CA 94105	(415) 974-8076	FTS: 454-8076
Juli Sears, Librarian Environmental Protection Agency, Region X 1200 Sixth Avenue Seattle, WA 98101	(206) 442-1289	FTS: 442-1289

ATTACHMENT C

APPENDIX A

INSTRUCTIONS

This report provides a list of the technical publication and studies applicable to the national industrial effluent discharge rulemaking activities which are currently available to review and distribution as follows:

- All publication are made available for review and inspection at the following:

  1. ENVIRONMENTAL PROTECTION AGENCY
     Public Information center
     Waterside Mall, S.E., Garage Level
     401 M. Street, S.W.
     Washington, D.C. 20460

     Phone Number: 646-6410 (local), or 800-828-4445 (toll free)

  2. Any EPA Regional Office Library (Attachment C)

- Publications can be purchased by submitting your request to the following:

  NATIONAL TECHNICAL INFORMATION SERVICE (NTIS)
  5285 Port Royal Road
  Springfield, VA 22161

  Order Desk Phone Number: (703) 487-4650

  Note: NTIS Asscession Number is required when ordering

Additional, the Industrial Technology Division projects and contacts for technical assistance are listed on Attachment B. Requests for further program assistance, question concerning the availability of publications, or inquiries about the status of rulemaking activities, may be directed to:

ENVIRONMENTAL PROTECTION AGENCY
Industrial Technology Division (WH 552)
Attn: Distribution Section
401 M. Street, S.W.
Washington, D.C.

Phone Number: (202) 382-7113

INDUSTRIAL TECHNOLOGY DIVISION'S PUBLICATION AVAILABILITY LIST

40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1- (YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
402	Cooling Water Intake Structures	Final	Best Technology Available for the Location Design Construction & Capacity of Cooling Water Intake Structure for Minimizing Adverse Environmental Impact	76/015-a	April 1976	PB 253573/AS
405	Dairy Product Processing	Final	Dairy Products Processing	74/021-a	May 1974	PB 238835/AS
406	Grain Mills	Final Final Supplemental	Grain Processing Animal Feed, Breakfast Cereal & Wheat Starch Corn Wet Milling	74/028-a 74/039-a 75/028-b	March 1974 December 1974 1975	PB 238316/AS PB 240861/AS ---------------------
407	Fruits & Vegetables-Canned & Preserved	Final Interim Final	Apple, Citrus & Potato Processing Fruits, Vegetables & Specialities	74/027-a 75/046	March 1974 October 1975	PB 238614/AS -------------------
408	Seafood Processing - Canned & Preserved	Final Final Report	Catfish, Crab, Shrimp & Tuna Fishmeal, Salmon, Bottom Fish, Sardine, Herring, Clams, Oyster, Scallop & Abalone Report congress: Section 74 Seafood Processing Study-Executive Summary	74/020-a 75/041-a 80/020 Vol. I Vol. II Vol. III	June 1974 September 1975 September 1980	PB 238614/AS PB 256840/AS PB 81182362 PB 81182370 PB 81182378
409	Sugar Processing	Final Final Interim Final	Sugar Processing - Best Sugar Sugar Processing - Cane Sugar Refining Sugar Processing - Raw Can Sugar Processing	74/002-b 74/002-c 75/044	January 1984 March 1984 February 1985	PB 238462/AS PB 238147/AS ---------------------
410	Textile Mills	Final	Textile Mills	82/022	September 1982	PB83-116871
411	Cement Manufacturing	Final	Cement Manufacturing	74/005-a	January 1974	PB 238610/AZ
412	Feedlots	Final	Feedlots	74/004-a	January 1974	PB 238651/AS
413	Electroplating	Final Guidance Final	Metal Finishing Guidance Manual for Electroplating and Metal Finishing Pretreatment Standards Existing Source Pretreatment Standards for the Electroplating point and source category	83/091 84/091-g 79/003	June 1983 February 1984	PB 84115989 ---------------------- PB 80196488
414	Organic Chemicals	Final	Organic Chemicals and Plastics & Synthetic Fibers	87/009 Vol. I Vol. II	October 1987	PB 88171335

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40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1- (YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
415	Inorganic Chemicals Manufacturing	Final Final	Inorganic Chemicals Manufacturing Phase I Inorganic Chemicals Manufacturing Phase II	82/007 84/007	June 1982 August 1984	PB 82265612 PB 85156446/XAB
416	Plastics & Synthetic Fibers (Materials Mfg)	Final	Organic Chemicals and Plastics & Synthetic Fibers	87/009 Vol. I Vol. II	October 1987	PB 88171335
417	Soap & Detergent Manufacturing	Final	Soap and Detergent Manufacturing	74/018-a	April 1974	PB 238613/AS
418	Fertilizer Manufacturing	Final Final	Fertilizer Manufacturing Formulated Fertilize Segment Fertilizer Manufacturing Basic Fertilizer Chemicals	75/042-a 74/011-a	1975 March 1975	PB 240863/AS PB 238652/AS
		Report	Summary Report- Phosphate Fertilizer Subcategory of the Fertilizer Point Source Category (40 CFR 418)		January 1982	
419	Petroleum Refining	Final	Petroleum Refining	82/014	October 1984	PB 82172569
420	Iron & Steel Manufacturing	Final Guidance	Iron and Steel Manufacturing Vol. I - General Vol. II - Coke Making, Sintering, Iron Making Vol. III - Steel Making, Vacuum Degassing and Continuous Casting Vol. IV - Hot Forming Vol. V - Salt Bath Descaling, Acid Pickling Vol. VI - Cold Forming, Alkaline Cleaning, Hot Coating Guidance Manual for Pretreatment Steel Manufacturing Point Source Category	82/024	May 1982 September 1985	 PB 82240425-a PB 82240433-a PB 82240441-c PB 82240458-d PB 82240466-e PB 82240474-f
421	Nonferrous Metals Manufacturing	Final	Dev. Doc. (Reference copy available in Public Record-EPA Headquarters)			
422	Phosphorus Manufacturing	Final Final Report	Dev. Doc. Phosphorus Derived Chemicals Manufacturing Dev. Doc. Other Non-Fertilizer Phosphates Chemicals Summary Report - Phosphate Fertilizer Subcategory of the Fertilizer Point Source Category (40 CFR 418)	74/006-a 75/043-a Contract # 68-1-4975	January 1974 June 1976 January 1982	PB 241018/AS
423	Steam Electric Power Generating	Final	Steam Electric	82/029	November 1982	

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40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1-(YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
424	Ferroalloy	Final Interim Final Interim Final	Smelting and Slag Processing Calcium Carbide Electrolytic Ferroalloys	74/006-a 75/038 75/038-a	1974 February 1975 February 1975	PB 241018/AS -- --
425	Leather Tanning	Supplement Final Guidance Final	Supplement Dev. Doc. - Leather Tanning and Finishing Guidance Manual for Leather Tanning and Finishing Pretreatment Standards Leather Tanning & Finishing	88/016-a 82/016	February 1988 September 1986 November 1982	PB 88213541 PB 83171593
426	Glass Manufacturing	Final Final Interim Final	Insulation Fiberglass Segment Flat Glass Segment Pressed & Blown Glass Segment	74/001-b 74/001-c 75/034-a	January 1974 January 1974 August 1975	PB 238078/AS PB 238907/0 PB 256854/AS
427	Asbestos	Final Final	Building, Construction, and Paper Segment Textile, Friction Materials and Sealing Devices Segment	74/017-a 74/035-a	February 1974 December 1974	PB 238320/AS PB 240860/AS
428	Rubber Processing	Final Final	Tire and Synthetic Segment Fabricated & Reclaimed Rubber	74/013-a 74/030-a	February 1974 December 1974	PB 238609/AS PB 241916/AS
429	Timber Products Processing	Final	Timber Production	81/023	January 1981	PB 81227282
430	Pulp, Paper, & Paperboard	Final Guidance Proposed	BCI Pulp and Paper Guidance Manual for Pulp, Paper, and Paperboard & Builder's Paper and Board Mills Control of Polychlorinated Biphenyis in the Deink Subcategory	86/025	December 1986 July 1984 1980	
431	Builder's Paper and Paperboard Mills	Final	Pulp, Paper and Paperboard and the Builder's Paper and Board Mills	82/025	October 1982	PB 83163949
432	Meat Products Processing & Rendering	Final Final Supplement Reprint/Final Supplement	Red Meat Processing Renderer Segment Supplement to Development Document for the Renderer Segment of the Meat Products & Renderering Supplement to Development Document for Meat Products & Rendering - Renderer Segment	74/012-a 74/031-d 78/031-e 77/031-e	 January 1975 September 1978 April 1977	PB 238836/AS PB 253572/2
433	Metal Finishing	Final Guidance	Metal Finishing Guidance Manual for Electroplating and Metal Finishing Pretreatment	83/091 84/091-g	June 1983 February 1984	PB 84115989
434	Coal Mining	Final	Coal Mining	82/057	October 1982	PB 83180422

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40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1- (YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
435	Oil & Gas Extraction	Proposed Report Interim Final Interim Final	Oil and Gas Extraction (Offshore) Assessment of Environmental Fact and Effects of Discharge from Offshore Oil and Gas Operations Oil and Gas Extraction Oil and Gas Extraction - Offshore	85/055 4-85/02 76/055-1 75/055	July 1985 August 1985 September 1976 September 1975	 PB 86114949/XAB
436	Mineral Finishing	Final	Mineral Mining and Processing	76/059-b	July 1979	PB 80110299
439	Pharmaceutical Manufacturing	Final Final	Pharmaceutical - BCT Pharmaceutical	86/084 83/084	December 1986 September 1983	 PB 84180066
440	Ore Mining and Dressing	Final Final	Placer Mining and Dressing - Gold Placer Mining Segment Ore Mining and Dressing	88/061 82/061	May 1988	
443	Paving & Roofing Materials (Tars & Asphalt)	Final	Tars			
444	Auto & Other Laundries	Guidance	Guidance Document for Effluent Discharges from the Auto and Other Laundries Point Source Category		February 1982	
446	Paint Formulating	Interim Final Interim Final	Oil Base Solvent Wash Subcategories Paint and Ink Formulating	75/049 75/050	1975 February 1975	
447	Ink Formulating	Interim Final	Oil Base Solvent Wash Subcategories	75/049	1975	
448	Printing &Publishing	Guidance	Summary of Available Information on the Levels of Controls of Toxic Pollutants Discharges in the Printing and Publishing Point Source Category	83/400	October 1983	
452	Concrete Products	Guidance	Concrete Products	78/090	February 1978	
454	Gum & Wood Chemicals Manufacturing	Interim Final	Gum and Wood Chemicals	76/060-b	April 1976	
455	Pesticide Chemicals Manufacturing	Final Interim Final	Pesticides Pesticides Chemicals Manufacturing	060-e 75/060-d	April 1978 November 1976	PB 285480
457	Explosives	Interim Final	Explosives Manufacturing	76/060-j	March 1976	
458	Carbon Black	Interim Final	Carbon Black Manufacturing	76/060-h	April 1976	

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40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1- (YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
459	Photographic Manufacturing	Interim Final Guidance	Photographic Processing Guidance Document for the Control of Water Pollution in the Photographic Processing Industry	76/060-l 81/082-g	June 1976 April 1981	 PB 82177643
460	Hospitals	Interim Final	Hospitals	76/060-n	April 1976	
461	Battery Manufacturing	Final Final Guidance	Battery Manufacturing: Vol. I - Cadmium Subcategory - Calcium Subcategory - Leclanche Subcategory - Lithium Subcategory - Magnesium Subcategory - Zinc Subcategory Battery Manufacturing: Vol. II - Lead Subcategory (erratta sheet p. 809) Guidance Manual for Battery Manufacturing Pretreatment Standards	84/067 84/067	August 1984 August 1984 August 1987	PB 121507 PB 121507
463	Plastics Molding & Forming	Final	Plastics Molding and Forming	84/069	December 1984	PB 84186823
464	Metal Molding & Forming (Foundaries)	Final	Metal Molding and Casting (Foundaries)	85/070	October 1985	PB 86171452/XAB
465	Coil Coating	Final Final	Coil Coating: Phase I Coil Coating: Phase II - Canmaking	82/071 83/071	October 1982 November 1983	PB 83205542 PB 84198647
466	Porcelain Enameling	Final	Porcelain Enameling	82/072	November 1982	
467	Aluminum Forming	Final Final	Aluminum Forming: Vol. I Aluminum Forming: Vol. II	84/073 84/073	June 1984 June 1984	PB 244425 PB 244433
468	Copper Forming	Final	Copper Forming	84/074	March 1984	PB 84192459
469	Electrical & Electronic Components	Final Final	Electrical and Electronic Components: Phase I Electrical and Electronic Components: Phase II	83/075 84/075	March 1983 February 1984	
471	Nonferrous Metals Forming	Final	Nonferrous Metals Forming Vol. I Vol. II Vol. III	86/019	September 1986	 PB 87121760 PB 87121778 PB 87121786

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40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1- (YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
472	Ethanol-for fuel	Guidance Guidance Guidance	Multimedia Technical Support Document: Ethanol-for-Fuel Industry Low BTU Gasifer Wastewater (1986) Low BTU Coal Gasification	86/093	April 1986	PB 86177557/AS PB 86245438/AS
	Dioxin	Study	U.S. EPA/Paper Industry Cooperative Dioxin Screening Study	88/025	March 1988	
	Domestic Sewage Study-Hazardous Wastes	Report	Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works	530-SW-86-004		PB 8618401/AS
	Fate of Priority Pollutants in POTWs	Baseline Study Vol. I Baseline Study Vol. II Baseline Study 30 day Study Baseline Study Pilot Study	Fate of Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works: Vol. I FATE of Priority Pollutants in Publicly Owned Treatment Works: Vol. II Fate of Priority Pollutants in Publicly Owned Treatment Works: 30 Day Study Fate of Priority Pollutants in Publicly Owned Treatment Works: Pilot Study	82/303 Vol. I 82/303 Vol. II 82/302 79/300	September 1982 September 1982 July 1982 1979	PB 83122788 PB 83122796 PB 8226330
	Total Toxic Organics RCRA Information-POTW	Baseline Study Guidance	RCRA Information on Hazardous Wastes for Publicly Owned Treatment Works	OWEP	September 1985	
	Fate of 129 Priority Pollutants - Water Related	Baseline Study Vol. I Baseline Study Vol. II	Water Related Environmental Fate of 129 Priority Pollutants - Introduction to Technical Background - Metals - Inorganics - Pesticides - Polychlorinated Biphenyls Water Related Environmental Fate of 129 Priority Pollutants - Halogenated Aliphatec Hydrocarbons - Halogenated Aromatics - Phthalate Esters - Nitrosamine - Miscellaneous Compounds	4-79/029-a Vol. I 4-79/029-a Vol. II	December 1979 December 1979	
	Total Toxic Organics - Pretreatment Standards	Guidance	Guidance Manual for Implementing Total Toxic Organic (TTO) Pretreatment Standards	Permits	September 1975	
	Combines Waste stream Formula	Guidance	Guidance Manual for the Use of Production Based Pretreatment Standards and the Combined Waste stream Formula	Permits	September 1985	

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40 CFR PART NUMBER	INDUSTRIAL POINT SOURCE CATEGORY	RULEMAKING STATUS	TITLE OF PUBLICATION	EPA DOCUMENT NUMBER 440/1- (YEAR/ID NUMBERS)	DATE OF PUBLICATIO N	NTIS ACCESSION NUMBER
	Paragraph 4© Program	Report	Paragraph 4© Program Summary Report		January 1984	
	Report to Congress: Limestone Discharge	Report	Report to Congress: The Effects of Discharger from Limestone Quarries on Waste Quality and Aquatic Biomonitoring	82/059	June 1982	PB 82242207
	Sampling Procedure and Protocols	Methods	Sampling Procedures and Protocols for the National Sewage Sludge Survey		March 1988	
	Analytical Methods	Methods	Sampling and Analysis Procedures for Screening of Industrial Effluent for Priority Pollutants		March 1977 revised April 1977	
	EPA Methods 1634 and 1635	Methods	Method 1634 Volatile Organic Compound in Municipal Wastewater Treatment Sludges by Isotope Dilution GC/MS; Method 1635 Semivolative Organic Compounds in Municipal Wastewater Treatment Sludges by Isotope Dilution GC/MS		July 1988	
	EPA Methods 1624 and 1625, Rev. C	Methods	Method 1624 Revision C: Volatile Organic Compounds by Isotope Dilution GC/MS Method 1625 Revision C: Semivolatile Organic Compounds by Isotope Dilution GC/MC		March 1988	
	EPA Method 1618 Consolidate GC Method	Methods	Narrative on the Development and Validation of the "Consolidated GC Methods for the Determination of ITD/RCRA Analytes Using Selective GC Detectors"		July 1986	
	Isotope Dilution GC/MS - Organics	Methods	Analysis of Extractable Organic Pollutant Standards by Isotope Dilution GC/MC		July 1986	
	Sewage Sludge Survey	Methods	Analytical Methods for the National Sewage Sludge Survey		March 1988	
	List of Lists	Report Report	The 1988 List of Lists - List of ITD/RCRA analytes The 1987 Industrial Technology Division List of Analytes		 March 1987	

INDUSTRIAL BADCT -- APPENDIX B

FEDERAL STANDARDS GUIDE

Category	40 CFR	* AZ #'s
ALUMINUM FORMING.......................	467.01	8
ASBESTOS MANUFACTURING.................	427.10	3
BATTERY MANUFACTURING..................	461.10	0
BUIDERS PAPER & BOARD MILLS............	431.10	1
CANNED AND PRESERVED FRUITS AND VEGETABLES PROCESSING................	407.10	120
CANNED AND PRESERVED SEAFOOD...........	408.10	0
CARBON BLACK MANUFACTURING.............	458.10	0
CEMENT MANUFACTURING...................	411.10	3
COIL COATING...........................	465.01	?
COOLING WATER INTAKE STRUCTURES........	401.14	?
DAIRY PRODUCTS PROCESSING..............	405.10	17
ELECTRICAL AND ELECTRONIC COMPONENTS...	469.10	450+
ELECTROPLATING.........................	413.01	
EXPLOSIVES MANUFACTURING...............	457.10	4
FERROALLOY MANUFACTURING...............	424.10	?
FERTILIZERS MANUFACTURING.............	418.10	3
GLASS MANUFACTURING..................	426.10	9
GRAIN MILLS...........................	406.10	5
GUM AND WOOD CHEMICALS MANUFACTURING..	454.10	0
HOSPITALS.............................	460.10	?
INK FORMULATING.......................	447.10	0
INORGANIC CHEMICALS...................	415.01	28
IRON AND STEEL MANUFACTURING..........	420.10	0
LEATHER TANNING AND FINISHING.........	425.01	3
MEAT PRODUCTS.........................	432.10	31
METAL FINISHING.......................	433.10	
METAL MOLDING AND CASTING............	464.01	

METAL POWERS..........................	471.10	
MINERAL MINING AND PROCESSING.........	436.20	600+
NONFERROUS METALS MANUFACTURING.......	421.10	
NONFERROUS METALS FORMING.............	471.01	
OIL AND GAS EXTRACTION................	435.10	?
ORE MINING AND DRESSING...............	440.10	?
ORGANIC CHEMICALS.....................	414.20	29
PAINT FORMULATING.....................	446.10	24
PAVING AND ROOFING MATERIALS..........	443.10	23
PESTICIDE CHEMICALS...................	455.10	0
PETROLEUM REFINING....................	419.10	3
PHARMACEUTICAL MANUFACTURING..........	439.00	20
PHOSPHATE MANUFACTURING...............	422.10	0
PHOTOGRAPHIC SUPPLIES.................	459.10	11
PLASTICS AND SYNTHETICS...............	416.10	
PLASTICS MOLDING AND FORMING..........	463.10	107
PORCELAIN ENAMELING...................	466.01	0
PRETREATMENT REGULATIONS..............	403.10	na
PULP, PAPER, AND PAPERBOARD...........	430.00	4
RUBBER MANUFACTURING..................	428.10	5
SOAP AND DETERGENTS MANUFACTURING.....	417.10	14
STEAM ELECTRIC POWER GENERATING.......	423.10	?
TEXTILE PRODUCTS......................	410.00	24
TIMBER PRODUCTS PROCESSING............	429.10	14

* These numbers represent a survey Arizona industries and are based an the l989 Edition of the Arizona Manufacturers Index, these industries are not necessarily subject to Aquifer Protection Permits. The indication "?" occurs where date was not available for this survey. Industries involved principly with military production are not necessarily represented in this survey.

Additionally, in the near future, the EPA may promulgate standards for nonconventional and toxic pollutants for the following:

Hazardous Waste Treaters

Solvent Recyclers

Machinery Manufacturing and Rebuilding

Transportation

Paint Manufacturing and Formulation

Industrial Laundries

Hospitals

Waste Oil Refiners

Substances Referenced in ARS 49-243-D -- APPENDIX C

Sources: 1) Organic substances listed by the secretary of the department of health and human services pursuant to 42 United States Code 241(b)(4), as known to be carcinogens or reasonably anticipated to be carcinogens.

2) Any organic substance listed in 40 Code of Federal Regulations 261.33(e), regardless of whether the substance is a waste subject to regulation under the Resource Conservation Recovery Act (P.L. 94-580; 90 Stat. 2795).

Note: Organic substances are considered by the Department to be carbon compounds exclusive of carbonates, cyanides and metal carbides.

	Acetaldehyde, chloro-
	Acetamide, 2-fluoro-
	Acetamide, N-(aminothioxomethyl)-
	Acetic acid, fluoro-, sodium salt
	Acetimidic acide, N-[(methylcarbamoyl) oxy] thio-methyl ester
2-	Acetylaminofluorence
1-	Acetyl-2-thiourea
	Acrolein
	Acrylonitrile
	Adriamycin
	Aflatoxins
	Aldicarb
	Aldrin
	Allyl alcohol
3-	(alpha-Acetonylbenzyl) -4-hydroxycoumarin and salts, > 0.3%
2-	Aminoanthraquinone
4-	Aminobiphenyl
5-	(Aminomethyl) -3-isoxazolol
4-a	Aminopyridine
1-	Amino-2-methylanthraquinone
	Amitrole
	Ammonium picrate (R)
	Analgesic mixtures containing phenacetin
o-	Anisidine and o-anisidine hydrochloride
	Aramite
	Arsine, diethyl-

	Azathioprine
	Aziridine
	Benzenamine, 4-chloro-
	Benzene
1, 2-	Benzenediol, 4-{1-hydroxy-2-(methylamino) ethylo]-
	Benzenethiol
	Benzene, (chloromethyl) -
	Benzidine
	Benzinamine, 4-nitro-
	Benzotrichloride
	Benzo (a) pyrene
	Benzo (b) fluoranthene
	Benzyl chloride
	Benz (a) anthracene
	Bischloroethyl nitrosourea
	Bis (chloromethly) ether and technical grade chloromethyl methyl et
	Bromoacetone
	Brucine
1, 4-	Butanediol dimethylsulfonate (myleran)
	Camphene, octachloro-
	Carbamimidoselenoic acid
	Carbon disulfide
	Carbon tetrachloride (tetrachloromethane)
	Carbonyl chloride
	Chlorambucil
	Chloroacetaldehyde
p-	Chloroaniline
1- (2-	Chloroethyl) -3-cyclohexyl-1-nitrosourea (CCNU)
	Chloroform (trichloromethane)
1-(o-	Chlorophenyl) thiourea
3-	Chloropropionitrile
4-	Chloro-o-phenylenediamine
	Coke oven emissions
	Conjugated estrogens
p-	Cresidine
	Cupferron
	Cyanogen
	Cyanogen chloride
	Cycasin
	Cyclophosphamide
	Dacarbazine
	DDT
2, 4-	Diaminotoluene
	Dibenzo (a,h) pyrene
	Dibenzo (a,i) pyrene
7H-	Dibenzo (c,g) carbazole

	Dibenz (a,h) acridine
	Dibenz (a,h) anthracene
	Dibenz (a,j) acridine
1, 2-	Dibromoethane (EDB)
1, 2-	Dibromo-3-chloropropane (DBCP)
3,3'	Dichlorobenzidine
1, 2-	Dichloroethane
	Dichlorophenylarsine
	Dieldrin
	Diepoxybutane
O, O-	Diethyl O-pyrazinyl phosphorothioate
	Diethyl sulfate
O, O-	Diethyl S-[2- (ethylthio) ethyl] phosphor-dithioate
	Diethylarsine
	Diethylstilbestrol
	Diethyl-p-nitrophenyl phosphate
	Diisopropyl fulorophosphate
	Dimethoate
3, 3'	Dimethoxybenzidine
O, O-	Dimethyl O-p-nitrophenyl phosphorothioate
	Dimethyl sulfate
4-	Dimethylaminoazobenzene
3, 3'	Dimethylbenzidine
	Dimethylcarbamoyl chloride
1, 1-	Dimethylhydrazine
	Dimethylnitrosamine
alpha, alpha-	Dimethylphenethylamine
3, 3-	Dimethyl-1-(methylthio)-2butanone, O-[(methylamino) carbonyl] oxim
2, 4-	Dinitrophenol
4, 6-	Dinitro-o-cresol and salts
4, 6-	Dinitro-o-cyclohexylphenol
	Dinoseb
1, 4-	Dioxane
	Diphosphoramide, octamethyl-
	Direct Black 38
	Direct Blue 6
	Disulfoton
2, 4-	Dithiobiuret
	Dithiopyrophosphoric acid, tetraethyl ester
	Di (2-ethylhexyl) phthalate
	Endosulfan
	Endothall
	Endrin
	Epichlorohydrin
	Epinephrine
	Estrogens (not conjugated): 1. Estradiol 17B

	Estrogens (not conjugated): 2. Estrone
	Estrogens (not conjugated): 3. Ethinylestradiol
	Estrogens (not conjugated): 4. Mestranol
	Ethanamine, 1,1-dimethyl-2-pheyl-
	Ethanamine, N-methyl-N-nitroso-
	Ethyl cyanide
	Ethylene oxide
	Ethylene thiourea
	Ethylenimine
	Famphur
	Fluoroacetamide
	Fluoracetic acid, sodium salt
	Formaldehyde (Gas)
	Fulminic acid, mercury (II) salt (R,T)
	Heptachlor
	Hexachlorobenzene
	Hexachlorohexahydro-exo, exodimethanonaphthalene
1,2,3,4,10,10-	Hexachloro-1,4,4a,5,6,7,8,8a-hexahydro-1,4:5,8-endo,endo-dimethan*
1,2,3,4,10,10-	Hexachloro-1,4,4a,5,6,7,8,8a-hexahydro-1,4:5,8-endo,exo-dimethanon
1,2,3,4,10,10-	Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahyro-endo,endo-1,4:5,8
1,2,3,4,10,10-	Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahyro-endo,exo-1,4:5,8-
	Hexaethyl tetraphosphate
	Hexamethylphosphoramide
	Hydrazine and Hydrazine sulfate
	Hydrazinecarbothioamide
	Hydrazine, methyl-
	Hydrazobenzene
	Ideno (1,2,3-cd) pyrene
	Iron dextram complex
	Isocyanic acid, methyl ester
3(2H)-	Isoxazolone, 5-(aminomethyl)-
	Kepone (Chlorodecone)
	Lindane and other hexachlorocyclohexane isomers
	Melphalan
	Mercury, (acetato-O) phenyl-
	Mercury fulminate (R,T)
	Methanethiol, trichloro-
	Methane, tetranitro- (R)
4, 7-	Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,6,6a-tetrahydro
	Methomyl
	Methyl hydrazine
	Methyl iodide
	Methyl isocyanate
	Methyl parathion
2-	Methylaziridine (propyleneimine)
4, 4'-	Methylenebis (2-chloroaniline) (MBOCA)

4, 4'-	Methylenebis (N, N-dimethyl) benzenamine
4, 4'-	Methylenedianiline and its dihydrochloride
2-	Methyllactonitrile
	Metronidazole
	Michler's ketone
	Mirex
	Mustard gas
2-	Naphthylamine
alpha-	Naphthylthiourea
	Nickel carbonyl
	Nickel tetracarbonyl
	Nitrilotriacetic acid
p-	Nitroaniline
	Nitrofen
	Nitrogen Mustard
2-	Nitropropane
p-	Nitrosodiphenylamine
5-	Nitro-o-anisidine
5-	Norbornene-2,3-dimethanol, 1,4,5,6,7,7-hexachloro,cyclic sulfite
	Norethisterone
	N-Nitrosoarcosine
	N-Nitrosodiethanolamine
	N-Nitrosodiethylamine
	N-Nitrosodimethylamine
	N-Nitrosodi-n-butylamine
	N-Nitrosodi-n-propylamine
	N-Nitrosomethylvinylamine
	N-Nitrosomorpholine
	N-Nitrosonornicotine
	N-Nitrosopiperidine
	N-Nitroso-N-ethylurea
	N-Nitroso-N-methylurea
	N,N-bis (2-chloroethyl) -2-naphthylamine (chlornaphazine)
	N-Phenylthiourea
	Octamethylpyrophosphoramide
7-	Oxabicyclo [2.2.1] heptane-2,3-dicarboxylic acid
	Oxymetholone
	Parathion
	Phenacetin
	Phenazopyridine hydrochloride
	Phenol, 2,4-dinitro
	Phenol, 2,4-dinitro-6-methyl-
	Phenol, 2,4,6-thrinitro-,ammonium salt (R)
	Phenol, 2,4-dinitro-6-(1-methylpropyl)-
	Phenol, 2-cyclohexyl-4-6-dinitro-
	Phenyl dichloroarsine

Phenylmercuric acetate
Phenytoin and sodium salt of phenytoin
Phorate
Phosgene
Phosphoric acid, diethyl p-nitrophenyl ester
Phosphorodithic acid, O,O-dimethyl S-[2-(methylamino)-2-oxyethyl]
Phosphorodithioic acid, O,O-diethyl O-(p-nitrophenyl) ester
Phosphorothioic acid, O,O-diethyl O-pyrazinylester
Phosphorothioic acid, O,O-diethyl O-(p-nitrophenyl) ester
Phosphorothioic acid, O-,O-diethyl O-[p-{(dimethylamino) - sulfonyl}
Plumbane, tetraethyl-
Polybrominated biphenyls
Polychlorinated biphenyls
Procarbazine and procarbazine hydrochloride
Progesterone
B- Proiolactone
Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino) carbonyl] oxim
1, 3- Propane sultone
Propanenitrile
Propanenitrile, 2-hydroxy-2-methyl-3-chloro-
Propanenitrile, 3-chloro-
1,2,3- Propanenitriol, trinitrate- (R)
2- Propanone, 1-bromo-
Propargyl alcohol
2- Propenal
2- Propen-1-o1
1,2_ Propylenimine
Propylthiouracil
2- Propyn-1-o1
4- Pyridinamine
Pyridine, (S) -3-(1-methyl-2-pyrrolildinyl)-, and salts
Pyrophosphoric acid, tetraethyl ester
Reserpine
Saccharin
Safrole
Selenourea
Soots, tars, and mineral oils
Streptozotocin
Strychnidin-10-one, and salts
Strychnidin-10-one, 2,3-dimethoxy-
Strychnine and salts
Sulfallate
2,3,7,8- Tetrachlorodibenzo-p-dioxin (TCDD)
Tetraethyl lead
Tetraethyldithiopyrophosphate
Tetraethylpyrophosphate

Tetranitromethane (R)
Tetraphosphoric acid, hesaethyl ester
Thioacetamide
Thiofanox
Thiomidodicarbonic diamide
Thiophenol
Thiosemicarbazide
Thiourea
Thiourea, 1-naphthalenyl-
Thiourea, phenyl-
Thiourea, (2-chlorophenyl)-
Toluene diisocyanate
o- Toluidine and 0-toluidine hydrochloride
Toxaphene
Trichloromethanethiol
2,4,6- Trichlorophenol
Tris (1-aziridinyl)phosphine sulfide
Tris (2,3-dibromopropyl)phosphate
Urethane
Vinyl chloride
Warfarin, when > 0.3%